

U.S. Patent Application Serial No. 10/657,180
Reply to Office Action of May 18, 2004

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently Amended): A refrigeration cycle apparatus using carbon dioxide as refrigerant and having a refrigerant circuit in which a compressor, an outdoor heat exchanger, an expander and an indoor heat exchanger which are all connected to one another through pipes, wherein an injection circuit is provided in said refrigerant circuit, and said injection circuit introduces high pressure refrigerant on the side of an outlet of said outdoor heat exchanger into an injection circuit for introducing high pressure refrigerant is provided in a halfway of an expansion process of said expander.

Claim 2 (Original): A refrigeration cycle apparatus according to claim 1, further comprising an adjusting valve for adjusting an amount of refrigerant from said injection circuit.

Claim 3 (Original): A refrigeration cycle apparatus according to claim 1, wherein said expander is provided at its refrigerant-inflow side with a pre-expansion valve.

Claim 4 (Original): A refrigeration cycle apparatus according to claim 1 wherein said expander is provided at its refrigerant-inflow side with a sub-expander.

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Claim 5 (Original): A refrigeration cycle apparatus according to claim 1, wherein said expander is provided at its refrigerant-outflow side with a sub-expander.

Claim 6 (Original): A refrigeration cycle apparatus according to claim 4 or 5, wherein an electric generator is connected to said sub-expander.

Claim 7 (Original): A refrigeration cycle apparatus according to any one of claims 1 to 5, wherein power recover by said expander is used for driving said compressor.

Claim 8 (Original): A refrigeration cycle apparatus according to any one of claims 1 to 5, wherein said compressor is provided at its suction side or discharge side with an auxiliary compressor, and power recover by said expander is used as power for driving said auxiliary compressor.

Claim 9 (Original): A refrigeration cycle apparatus according to any one of claims 1 to 5, further comprising a first four-way valve to which a discharge side pipe and a suction side pipe of said compressor are connected, and a second four-way valve to which a discharge side pipe and a suction side pipe of said expander are connected, wherein refrigerant discharged from said compressor is selectively allowed to flow into said indoor heat exchanger or said outdoor heat

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exchanger by said first four-way valve, a direction of refrigerant flowing through said expander is always set in the same direction by said second four-way valve.

Claim 10 (Original): A refrigeration cycle apparatus according to claim 8, further comprising a first four-way valve to which discharge side pipes and suction side pipes of said compressor and said auxiliary compressor are connected, and a second four-way valve to which a discharge side pipe and a suction side pipe of said expander are connected, wherein refrigerant discharged from said compressor and said auxiliary compressor is selectively allowed to flow into said indoor heat exchanger or said outdoor heat exchanger by said first four-way valve, a direction of refrigerant flowing through said expander and said sub-expander is always set in the same direction by said second four-way valve.